oxygen." More objectionable still are occasional instances of bogus reasoning, the most striking example being an erroneous proof of the conservation of mass. On three different occasions the indestructibility of matter is stated to be a consequence of the law of definite proportions. Almost equally bewildering is an attempt to show that "a molecule occupies two volumes," an attempt which even when correctly carried out might well be excluded from a book which professes to discourage anything akin to cramming. No advance is made in familiarizing the learner with accurate conceptions of atom and molecule; indeed the need for the latter conception in chemical philosophy is quite overlooked.

Throughout the book the author's mode of expressing himself is frequently not the happiest. To say that "air allows all bodies that will to take fire in it," or that "chlorine does not combine with an excess of hydrogen" is harmless enough perhaps. On the other hand to talk of the "properties of a mixture" being the "sum of the properties of its constituents," or of the gas being kept dissolved in a bottle of soda water "by the pressure of the cork," or to say that "water has weight and exerts pressure" cannot but be puzzling to the intelligent reader.

To prepare a thoroughly good introduction, of the most elementary kind, to the study of chemistry, is a work of considerable difficulty, indeed it is one which few of our leading chemists seem desirous of undertaking. Enough we think has been quoted from the book under notice to show that the author has by far underrated the difficulty of this task. J. W. R.

LIFE AND DEATH.

Essai sur la Vie et la Mort. Par Armand Sabatier. (Paris: Babé et Cie.)

PROF. SABATIER'S "Essai sur la Vie et la Mort" forms the fourth volume of the "Bibliothèque Évolutioniste," a series of books published under the direction of M. de Varigny, with the view of expounding in a strictly scientific manner the different principles and the diverse applications of the theory of Evolution. The series most appropriately begins with a translation of Wallace's "Darwinism," and it is gratifying to our national pride to find that the two other works which have as yet appeared in the series, Ball's "Treatise on Use and Disuse," and Geddes' and Thomson's "Evolution of Sex," as well as the two others announced as in the press, are all by British authors.

The present essay, which extends over 280 pp., is the outcome of a series of lectures delivered at the University of Montpellier. It is written in a clear, simple style, devoid for the most part of all technicalities which appeal only to the specialist. The problems of life and death are dealt with from an exclusively biological point of view, and questions of morality and theology are hardly touched upon. It is difficult to do justice to the views expounded in the book in the short space at our disposal, but an attempt may be made to give a short account of its contents. The first part deals with life: the properties of living matter are considered in great detail, and Prof. Sabatier endeavours to show that the attributes of life are found to some extent, at any rate, in dead matter. According to his views "la matière brute est vivante aussi," but the manifestations are slow and dull. To the Professor's mind living matter and dead matter are not absolutely distinct: between the two states of matter there is only a difference of degree and not of kind. "La vie donc est partout, dans la matière dite inanimée comme dans la matière vivante." The various features in which dead matter behaves like living, are considered at great length; but, curiously enough, no mention is made of Bütschli's remarkable experiments on artificial amœbæ, recently described in the "Quarterly Journal of Microscopical Science."

This view being accepted, death in the ordinary sense of the word, naturally cannot exist, and the phenomenon which we usually call death becomes but another form of life—"la vie intense" simply passes into the state of "la vie lente." Immortality, according to our author, consists in the indefinite continuity of life ("la vie intense") without arrest or interruption. Like Weismann, he maintains that the negation or the contrary of such immortality involves the presence of a dead body or corpse. Weismann holds that ciliated infusoria are immortal if kept under favourable conditions, these conditions, of course, including frequent opportunities of conjugating. Sabatier considers that such infusoria are only potentially immortal, and that the act of conjugation converts this potentiality into a real immortality. In his opinion the primitive protoplasm was immortal, and the habit of dying has been acquired by the higher organisms in response to two stimuli, one internal and one outside themselves. The internal cause of death is associated with a tendency innate in the living being to improve its position in the world, in response to which it has become more specialized, and developed new organs and powers. This specialization has borne with it the seeds of death. The external cause is the surrounding world, which constantly stimulates and promotes the organism to new efforts, and in the struggle for the mastery death is brought about.

Although we fail to see that Prof. Sabatier has thrown any new light upon the problems he attempts to solve, and although the explanations he advances seem to us inadequate, his book is a useful one, inasmuch as he gives us a careful summary of the numerous views advanced by various writers in the last twenty-five years, on the subject of life and death, and criticises with considerable ability the theories of Weismann, Goette, Minot, &c. In fact, his destructive powers seem greater than his constructive. A. E. S.

OUR BOOK SHELF.

Contagious Foot Rot in Sheep. By Prof. G. T. Brown, C.B., 16 pp., 8 illustrations, (John Murray).

THIS pamphlet is a reprint from the second part of the current volume of the Royal Agricultural Society's Journal. A few additional remarks on the prevention of foot rot have been added, and if the instructions given were fully carried out, the disease would soon cease to be troublesome. The preventive suggestions are (1) separation from the rest of the flock for one month of all animals newly purchased; and (2) isolation of all animals affected.

In discussing the treatment of the disease, Prof. Brown

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insists upon the importance of detecting it at an early stage, and in the first part of the pamphlet he explains how to do this with certainty.

The pamphlet ought to be read by everyone interested in agriculture: and to make it better known the Society has printed as a leaflet a few notes upon the subject. In America the pamphlet would be sent broadcast amongst those interested, and it is to be hoped that Government assistance may soon enable our own Agricultural Society to disseminate knowledge in a similar way.

W. T.

How to Make Common Things. By John A. Bower. (Society for Promoting Christian Knowledge, 1892.)

IT would be a strange boy who never wanted "to make something." The present little book has been prepared for boys who feel this desire very strongly, but do not quite know how to set about the fulfilment of their wish. They will here find ample information on the best way of making a vast number of things, from a hat-rail to a galvanometer, from a pair of stilts to a needle-telegraph. The author assumes throughout that those whom he addresses are not being taught by a personal instructor in handicrafts, and that they are not the possessors of an elaborate array of tools. His directions are clear and practical, and cannot fail to be appreciated by boys who find much to interest them in the exercise of ingenuity and manual skill.

The Student's Manual of Deductive Logic, Theory and Practice. By K. R. Bose. (Calcutta: S. K. Lahari and Co., 1892.)

THIS book is intended for the use of students at the various Indian colleges, and will be regarded by most teachers of the subject as, upon the whole, a very good text-book. The author has read many of the best European writers on logic, and presents clearly a summary of their results. He begins with a definition of logic, gives some account of its "branches and parts," and then considers terms, propositions, and inferences. What he himself describes as "the distinguishing feature" of the book is a collection of problems and exercises with solutions, or hints towards solution, in close correspondence with the subject-matter of the text.

A Text-Book of Agricultural Entomology. By Eleanor A. Ormerod. Second Edition. (London: Simpkin, Marshall and Co. 1892.)

THE first edition of this book was published about eight years ago. It consisted of lectures which the author had delivered at the Institute of Agriculture of South Kensington. There was not much demand for it until last year, when attention was directed to it by the arrangements of the County Councils for the promotion of agricultural education. The work was then so widely appreciated that a new edition was soon called for, and there can be no doubt that in its new form it will be more popular than ever, for Miss Ormerod has done everything in her power to make it not only scientifically accurate but practically useful. Students will find it of great service in helping them to a knowledge of insect life and of the best remedies for "infestations."

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

A Functional Hermaphrodite Ascidian.

AS of late years a considerable number of structural hermaphrodites have been shown to be protogynous or protandrous, or to have some special modification for the purpose of preventing self-fertilization, it may be of interest to have on record a case of a completely functional hermaphrodite.

I had living lately in one of my dishes a large *Ascidia* (probably *A. rubicunda* of Hancock) which I observed one morning to be expelling eggs from the atrial aperture. The eggs were emitted in batches of from about twelve to twenty at a time, and immediately after each set of eggs came a little white milky jet which hung like a string in the water for a few seconds and then spread out and disappeared. On catching some of this string in a pipette and examining it with the microscope it was seen to be a mass of active spermatozoa. This alternating passage of ova and spermatozoa continued for fully an hour.

The ova at first floated at the surface of the water for a short time and then slowly sank to the bottom. On examining some of those on the bottom of the dish after a couple of hours they were found to have commenced development, being in various stages of segmentation: so there can be no doubt that self-fertilization had taken place.

Very likely this occurs in some other species also, but another common Ascidian (*Corella parallelogramma*), of which I had had several large specimens living a few weeks before, laid eggs in my dishes, and I could not detect any spermatozoa being produced by these individuals. They were functionally female although structurally hermaphrodite.

W. A. HERDMAN.

University College, Liverpool, October 3.

The Present Comets.

ON the 27th ult. about 15½h. G.M.T. comet Brooks (*c*, 1892) had a tail 10′ long, pointing at a position-angle of 280°.

At the latter part of last month Swift's comet (*a*, 1892) was still a very conspicuous object in a 4¼-inch refractor. Observations on several nights showed that it not only still had a very faint tail—at position-angle 260° on the 24th at 8½h, when I observed it to be certainly 11′ long, and suspected it to 21′—but that also there was an elongation nearly in the opposite direction; while I believe the radius of the head was less towards *n* than towards *s*, but I have not been able to satisfy myself of this.

Sunderland, October 5. T. W. BACKHOUSE.

Women and Musical Instruments.

IN looking over a very large collection of musical instruments from the aborigines of America, I am surprised to find that there is not one peculiar to women, and that those of the men are never played by the women. It is true that the females beat time on various objects and may now and then use the rattle. This disappointing fact arrested my attention, and I am curious to know whether savage women, or any other women for that matter, have ever invented a musical instrument, and whether in savagery they even play upon those invented by the men. The composition and singing of songs might also be inquired into, though our American savage women do join in certain choruses. OTIS T. MASON.

Washington, U.S.A., September 26.

Determination of g by Means of a Tuning Fork.

MR. C. V. BOYS informs me that for the converse process of determining the pitch of a tuning-fork, the experiment I described recently is no new one, but has been used by him for the last ten years in the instruction of students in South Kensington. I observe, however, that he has not made the same use of the trace to eliminate the zero error. A. M. WORTHINGTON.

THE TOTAL ECLIPSE OF THE SUN, 1893.

AS I have been asked by some astronomers to give a description of the general appearance and climate of this part of Chile, in which a total eclipse of the sun occurs next year, I have drawn up for publication the following account:—

The eclipse takes place on April 16, 1893, at about 8.15 A.M., Chile local time, and will be seen to the greatest advantage in this part of the Province of Atacama.

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